WE CLAIM:

1. A system for prescribing point-to-point channels among nodes, comprising means for
inputting the total number of nodes;
inputting the maximum number of faulty nodes;
determining an assignment of fewest channels
that guarantees every pair of fault-free nodes
is connected by some path in the same quorum;
and outputting the channel assignments.

2. The system as recited in claim 1, with means for minimizing the quorum radius or diameter.

3. The system as recited in claim 1, with means for
inputting channel cost; and
determining a minimum cost channel assignment.

4. The system as recited in claim 1, with means for
inputting latencies for nodes and channels; and
determining a minimum cost channel assignment
that minimizes the maximum quorum latency.

5. The system as recited in claim 1, with means for
inputting capacities for nodes and channels; and
determining a minimum cost channel assignment
which maximizes quorum throughput.

6. The system as recited in claim 1, with means for
inputting node values; and
determining a channel assignment
with maximum quorum value, gross or net.

7. The system as recited in claim 1with faults distributed probabilistically or deterministically.

8. The system as recited in claim 1, such that the guarantee of quorum formation is replaced by probabilistic assurance.

9. The system as recited in claim 1, such that faults may occur in channels, nodes, or both channels and nodes.

10. The system as recited in claim 1, such that the channel assignment is required to be regular, or nearly so.

11. The system as recited in claim 1, such that the quorums may contain an arbitrarily specified number or proportion of faults.

12. The system as recited in claim 1, such that the channel assignments correspond to test assignments for mutual test and diagnosis (MTAD).

13. The system as recited in claim 1, such that edges in the underlying graph model are generalized to directed multi-edges or hyper-edges.

14. A computer implementation of the system recited in claim 1.

15. The computer implementation as recited in claim 14, with the objective of designing or operating multicomputers, networks, bus structures, or circuits.

16. A method for prescribing point-to-point channels among nodes, comprising
inputting the total number of nodes;
inputting the maximum number of faulty nodes;
determining an assignment of fewest channels
that guarantees every pair of fault-free nodes
is connected by some path in the same quorum;
and outputting the channel assignments.

17. The method as recited in claim 16, additionally minimizing the quorum radius or diameter.

18. The method as recited in claim 16, additionally
inputting channel cost; and
determining a minimum cost channel assignment.

19. The method as recited in claim 16, additionally
inputting latencies for nodes and channels; and
determining a minimum cost channel assignment
that minimizes the maximum quorum latency.

20. The method as recited in claim 16, additionally
inputting capacities for nodes and channels; and
determining a minimum cost channel assignment
which maximizes quorum throughput.

21. The method as recited in claim 16, additionally
inputting node values; and
determining a channel assignment
with maximum quorum value, gross or net.

22. The method as recited in claim 16, with faults distributed probabilistically or deterministically.

23. The method as recited in claim 16, such that the guarantee of quorum formation is replaced by probabilistic assurance.

24. The method as recited in claim 16, such that faults may occur in channels, nodes, or both channels and nodes.

25. The method as recited in claim 16, such that the channel assignment is required to be regular, or nearly so.

26. The method as recited in claim 16, such that the quorums may contain an arbitrarily specified number or proportion of faults.

27. The method as recited in claim 16, such that the channel assignments correspond to test assignments for mutual test and diagnosis (MTAD).

28. The method as recited in claim 16, such that edges in the underlying graph model are generalized to directed multi-edges or hyper-edges.